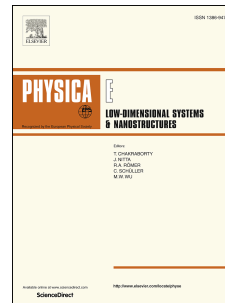


Accepted Manuscript

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PII: S1386-9477(17)31547-3

DOI: [10.1016/j.physe.2018.02.018](https://doi.org/10.1016/j.physe.2018.02.018)

Reference: PHYSE 13057

To appear in: *Physica E: Low-dimensional Systems and Nanostructures*

Received Date: 8 October 2017

Revised Date: 2 February 2018

Accepted Date: 16 February 2018

Please cite this article as: A.H. Saeedi, M. Akbari, D. Toghraie, An experimental study on rheological behavior of a nanofluid containing oxide nanoparticle and proposing a new correlation, *Physica E: Low-dimensional Systems and Nanostructures* (2018), doi: 10.1016/j.physe.2018.02.018.

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An experimental study on rheological behavior of a nanofluid containing oxide nanoparticle and proposing a new correlation

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Abstract

In this paper, the nanofluid dynamic viscosity composed of CeO₂- Ethylene Glycol is examined within 25 to 50°C with 5°C intervals and at six volume fractions (0.05, 0.1, 0.2, 0.4, 0.8 and 1.2 percent) experimentally. The nanofluid was exposed to ultrasound waves for various durations to study the effect of this parameter on dynamic viscosity of the fluid. We found that at a constant temperature, nanofluid viscosity increases with increases in the volume fraction of the nanoparticles. Also, at a given volume fraction, nanofluid viscosity decreases when temperature is increased. Maximum increase in nanofluid viscosity compared to the base fluid viscosity occurs at 25°C and volume fraction of 1.2 percent. It can be inferred that the obtained mathematical relationship is a suitable predicting model for estimating dynamic viscosity of CeO₂- Ethylene Glycol (EG) at different volume fractions and temperatures and its results are consistent to laboratory results in the set volume fraction and temperature ranges.

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